Cryogenic Dark Matter Search (CDMS)

Progress at Soudan since last summer

- Successful run with 5 towers

Prospects at Soudan

- Continued data taking with 5 towers (4 kg Ge)

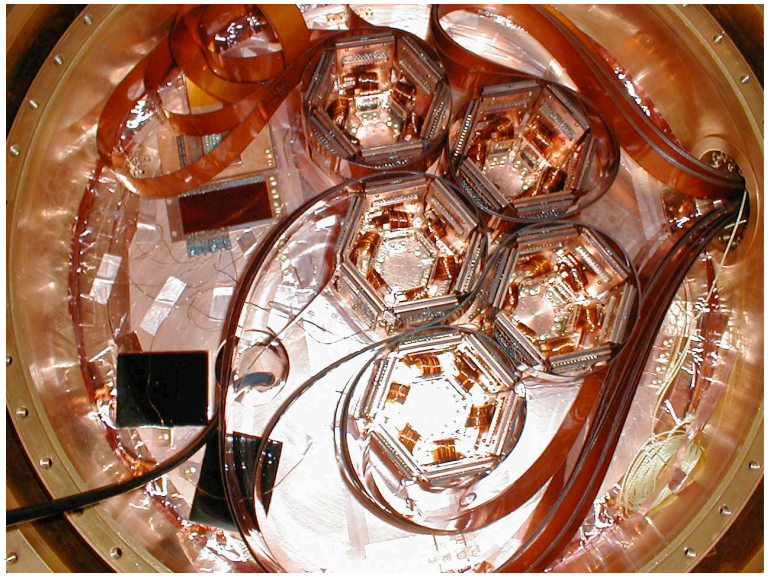
The Future - SuperCDMS at SNOLAB

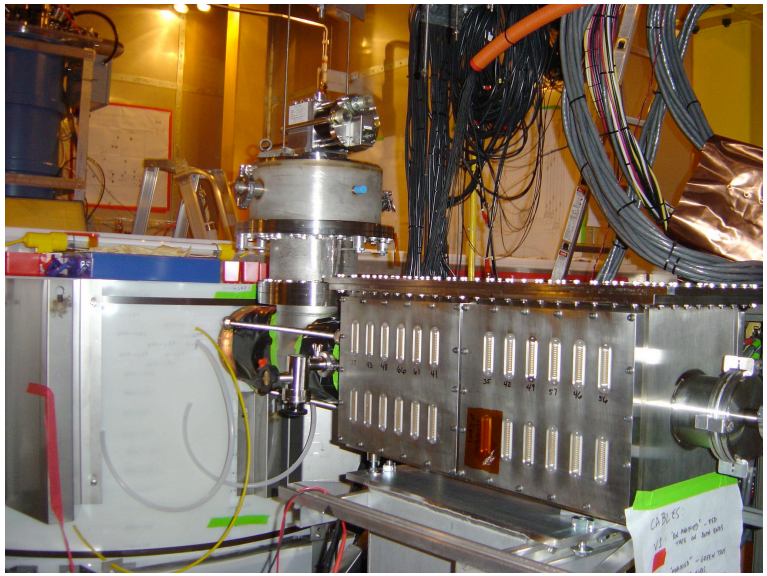
- Larger target mass (25 kg) and lower backgrounds

Dan Bauer - CDMS Project Manager

Cryogenic and Detector Upgrades

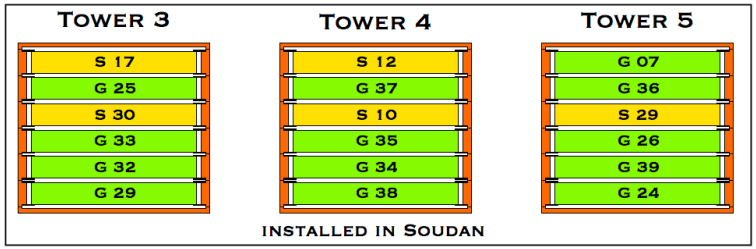
- Cryogenics Upgrades
  - Better vacuum to improve stability, decrease maintenance
  - Better control and monitoring, more robust against power outages (UPS and generator installed)
  - Improve cooling at 4K with cryocooler on electronics stem; reduce Lhe consumption, costs; had to deal with vibration problems
- Detectors
  - Three new towers installed (each with 6 detectors); total of 4.5 kg Ge, 1 kg Si
  - Thermal connections to refrigerator improved





Commissioning of the 5 Tower System July-September 2006

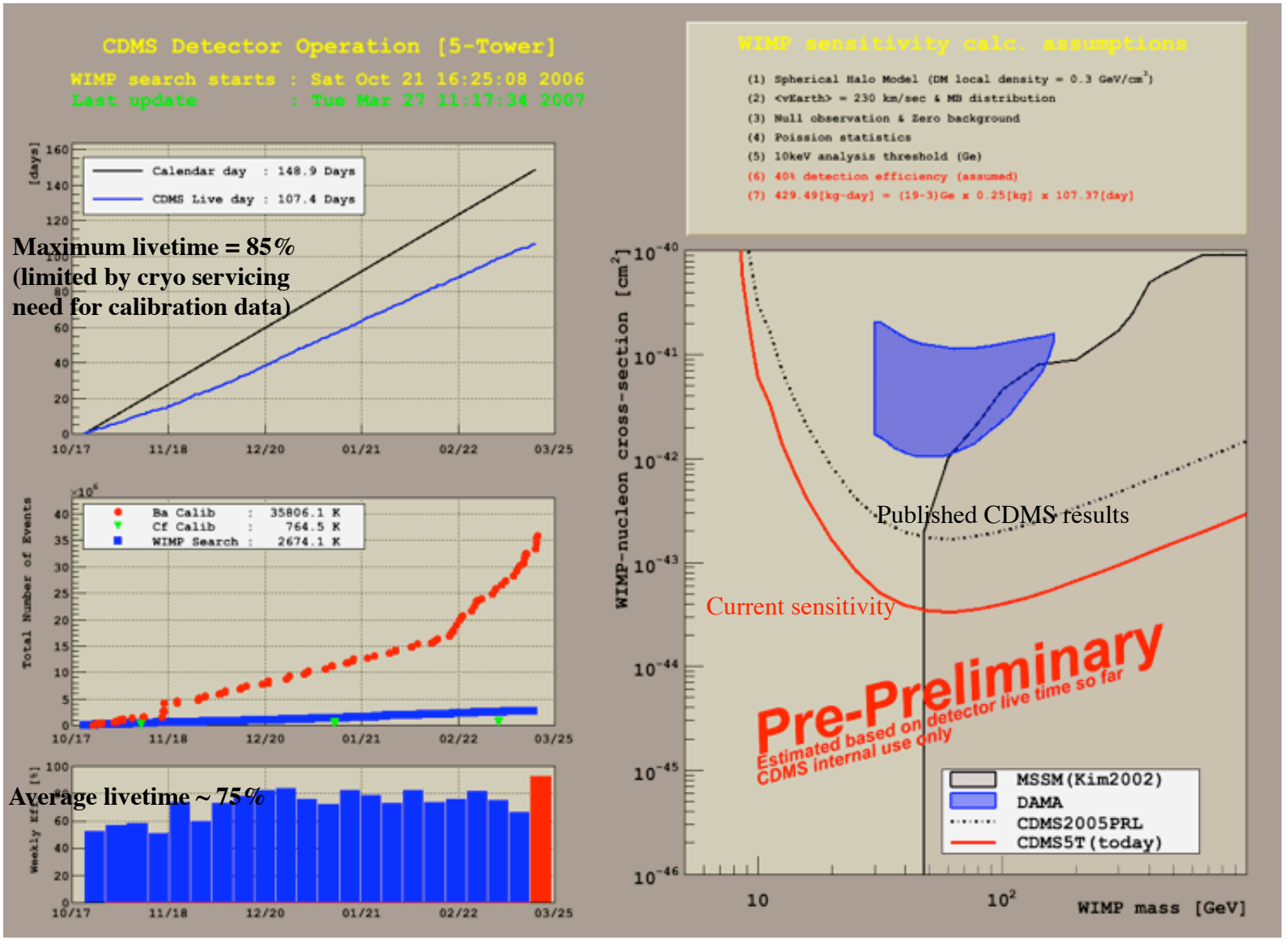
- Detector Tuneup
  - Optimize SQUID, TES settings
  - Neutralize crystals with LEDs
  - LOTs of calibration data
- DAQ and online analysis
  - Handle 80 Hz calibration rate
  - Robust data pipeline to surface
  - Near realtime analysis for data quality monitoring
- Electronic noise reduction
  - Systematic work to eliminate unnecessary grounding
  - Eliminate a few strong sources of RF (cordless phones)
  - Reduce 60 Hz harmonics



Data run with 5 towers
October 2006 - March 2007

- Vital statistics
  - Base temperature (40 mK) for ~ 9 months
  - 5 months of high-efficiency data taking (**430 kg-days Ge**)
    - 107.4 live days for WIMP search (2.7 million events)
    - 36 million gamma calibration events
    - 0.76 million neutron calibration events
    - 4 TB of data
- Blind analysis underway
  - Cuts set using calibration data
  - Expect to open nuclear recoil region this summer
  - Present results at fall conferences
  - Sensitivity should be at least x3 better than present

First Five Tower Run Summary



A short break for maintenance

- Warmed up to 4K in mid-March
  - Serviced vacuum pumps, clean 3He/4He mixture
  - Eliminated partial obstruction in dilution unit
- Successfully back to base temperature by end of March
  - Addressing some low-level electronics noise (60 Hz harmonics)
  - Minor detector retuning; new triggers
  - Backup power completed

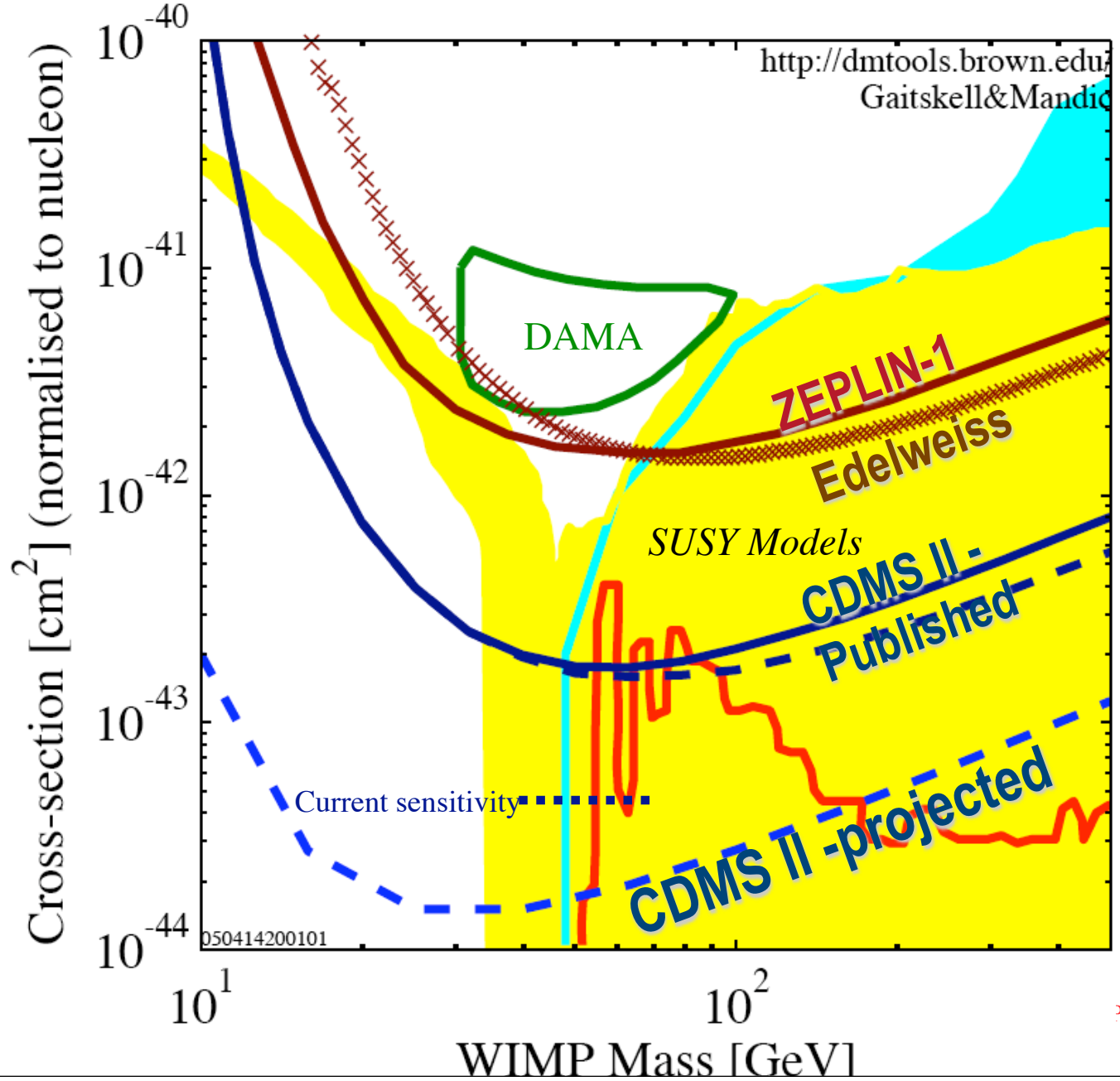
Underground diesel generator to maintain cryogenics

Large UPS to backup electronics

Second data run with 5 towers
April 2007 - April 2008

- Aim for another x3 improvement in sensitivity (~1200 kg-d)
  - Combined x10 better than present limits
  - Or perhaps we might start to see signal
- May start to run into backgrounds at Soudan in 2008
  - Beta backgrounds on some detectors
  - Neutrons from cosmic rays
- If background-free, run 5 towers into 2009
  - Possible to insert first two SuperCDMS towers in 2009

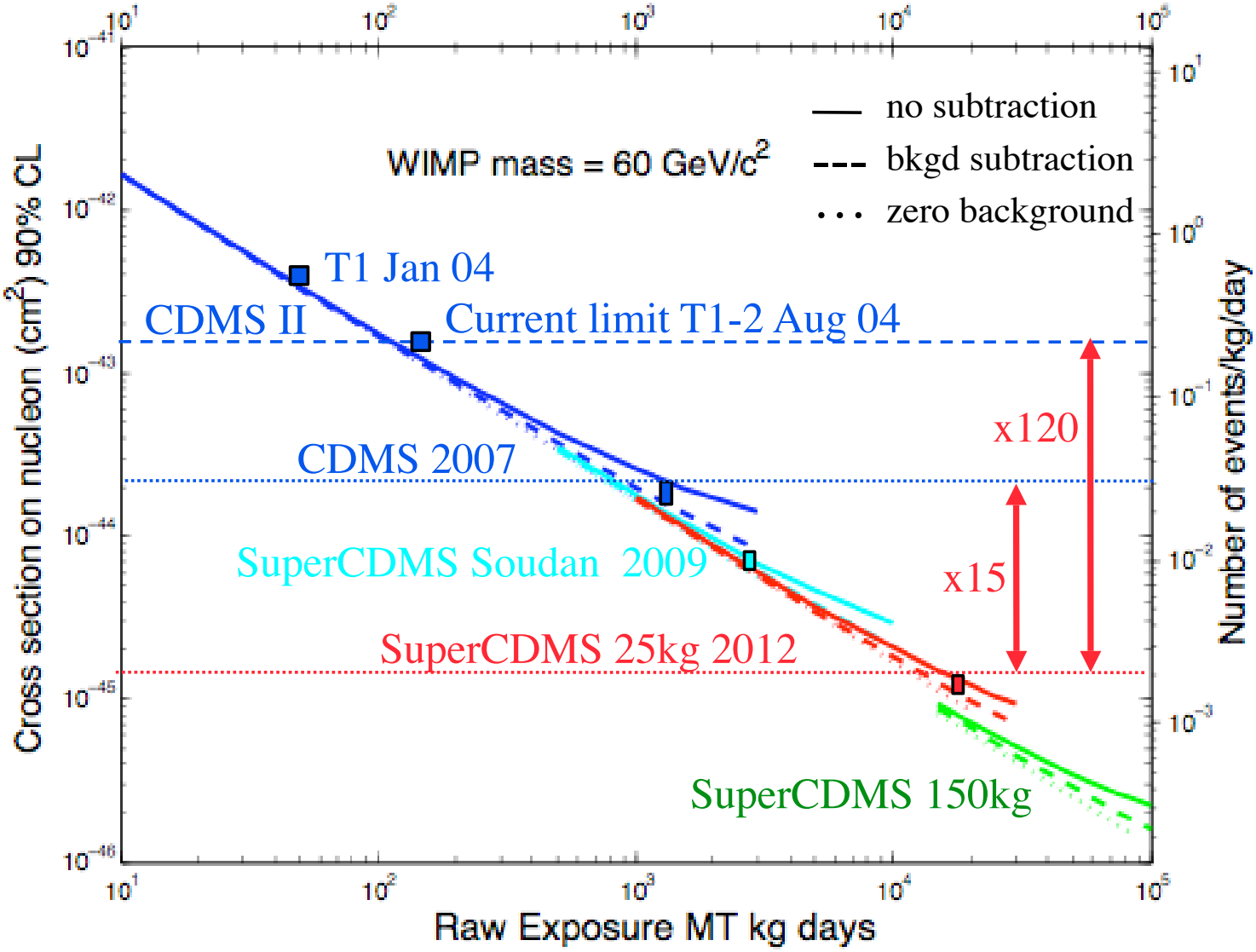
The Future of CDMS at Soudan



Good chance that a WIMP signal begins to appear here!

Project Manager

Vital to remain background-free



SuperCDMS 25 kg at SNOLAB

- Cosmic-induced neutron background will appear at Soudan
  - SNOLAB is x3 deeper; no fast neutrons
  - SNOLAB available in early 2008 (DUSEL much later)
- Further reductions in backgrounds necessary
  - Whole lab is class-2000 cleanroom at SNOLAB
- Increase detector mass by x6 (4 ---> 25 kg)
  - Improved volume to surface (reduce surface backgrounds)
  - Entire detector mass will be Ge (Si no longer needed)
- Improved design for cryogenics system
  - Cryocoolers allow cryogen-free dilution refrigerators!
  - Considerably cheaper to operate, less maintenance
- Goal is x15 improvement in sensitivity
  - We hope to be exploring a WIMP signal by then!